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 ER

12 March 1982

NOTE FOR: EA/DDI
SA/DDO

This note passes on some information and asks for some high-speed assistance from your good officers.

The DDCI received the attached memo from Admiral Burkhalter at DIA recently. Given the DDCI's travel plans next week, we need an answer to Admiral Burkhalter's proposal by 5:00 today. The core of Admiral Burkhalter's proposal is contained in paragraph 5 on the second page of the correspondence. In an effort to speed this whole process up, I held an ad hoc meeting in my office this morning at 9:15 with an officer from NE Division [redacted] and two branch chiefs from OSWR [redacted] We collectively read the DIA correspondence, discussed the research necessary to produce an answer, considered the 5:00 due date, and understood that whatever the substantive answer that the DDO and the DDI jointly produce has to be vetted by each Directorate's leadership. I provided copies of the attachment to [redacted] this morning. STAT STAT STAT

I appreciate your help in getting your branch chiefs to the 9:15 meeting.

If there is anything I can do to assist you, such as answer questions, please let me know.

[redacted] STAT
SA/DDCI

Attachment

MAR 12 9 58 AM '82

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DEFENSE INTELLIGENCE AGENCY
WASHINGTON, D.C. 20301

5 MAR 1982

DT-TSC-002/82

MEMORANDUM FOR ADMIRAL INMAN

[redacted]

DIA
25X6

E. A. Burkhalter, Jr.

E. A. BURKHALTER, JR.
Rear Admiral, USN
Deputy Director

1 Enclosure
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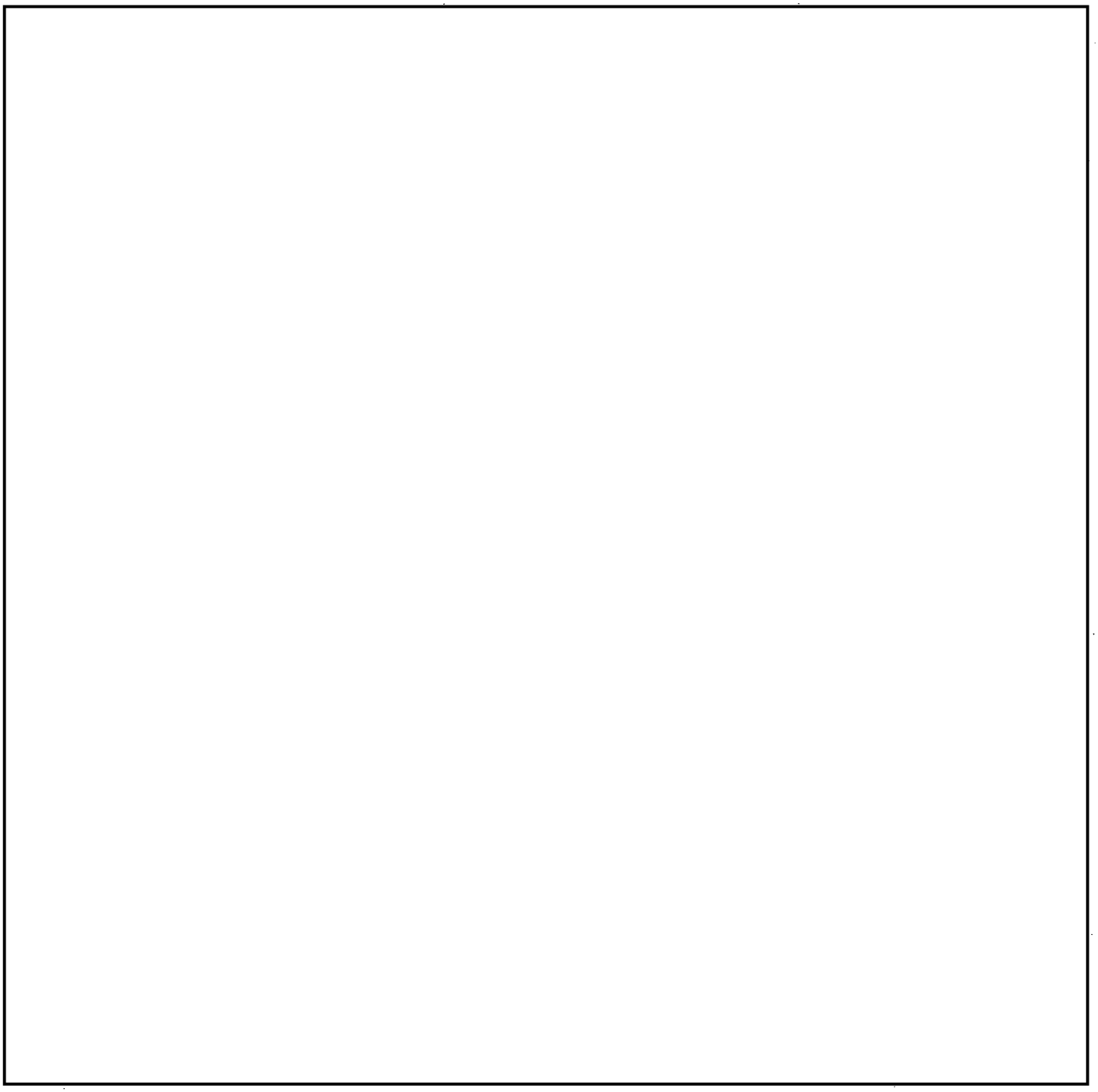

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Egypt's Technology Shift

U.S. Helps to Update Soviet-Built

By Clarence A. Robinson, Jr.

Cairo—The nation's fourth military service branch—the Egyptian Air Defense Force—is relying heavily on the U.S. Army and aerospace industry to modernize Soviet-built surface-to-air missile systems, to provide spare parts and test equipment, and to increase air defense capabilities with new U.S. weapons systems.

The U.S. Army Missile Command, Huntsville, Ala., is managing in excess of $173 million in Foreign Military Sales funding to refurbish and improve performance of Soviet air defense weapons, including early warning radar systems, operated here by the Air Defense Force.

The U.S. already has developed data packages on the Soviet air defense weapons in Egypt, including reverse engineering specifications for the missiles, acquisition and tracking radars, and command, control and communications systems that are used in combined air defense command posts.

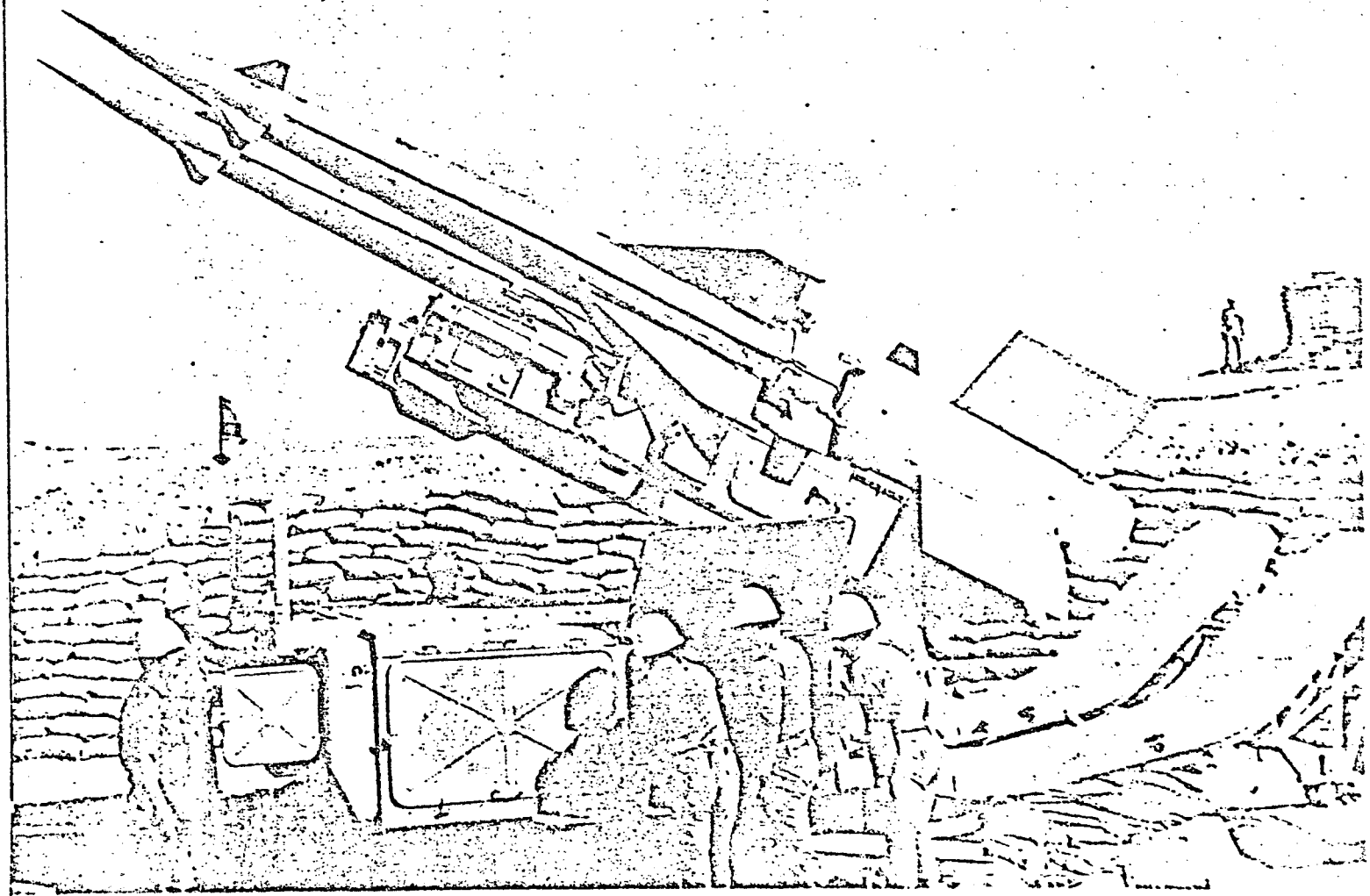
The technical capability exists in the U.S. to exploit fully Egyptian air defense hardware with newly designed parts and subassemblies, replacing Soviet components not only to improve engagement performance but to extend the life of the weapons systems for another 10 years, according to Air Defense Force officers here.

Egypt depends principally on surface-to-air missiles and air defense gun systems to protect the country from aerial attack, but it also integrates fighter/interceptor aircraft such as the Mikoyan MiG-21 especially to engage targets at higher altitudes.

The country is divided into air defense engagement zones in which surface-to-air missiles play the dominant role. Fighter aircraft can pursue hostile aircraft into the air defense zones in which integrated missile systems provide interlocking bands of air defense coverage at all altitudes, but Egyptian pilots must alert the air defense sector command post that they are in pursuit within the zone.

There is a risk that some Egyptian fighter aircraft will be engaged by Egyptian Air Defense missiles, but the Ministry of Defense is prepared to suffer some aircraft losses to guarantee engagement of hostile aircraft.

Targets detected beyond air defense



Soviet-built SA-3 Goa surface-to-air missiles are positioned on the launcher for intercept trajectory during a demonstration of the weapon system in a field position approximately 30 mi. northeast of Cairo. The SA-3 provides air defense coverage down to 150-ft. altitude and as high as 60,000-ft. altitude with a minimum range of 1.5 naut. mi. and a maximum range of 12 naut. mi. The SA-3s are tied in with SA-2 Guideline missile system radars and air defense guns and other surface-to-air missile systems.

Weaponry

missile zones are engaged by interceptor aircraft, as are those at higher altitudes. The authority to engage aerial targets rests at the brigade level here but can be delegated to subordinate units if required.

Egypt is gradually changing from the Soviet style of military organization and moving from the brigade structure toward what is roughly analogous to a U. S. Army surface-to-air missile battalion with subordinate batteries. This change will be accelerated as U. S. missile systems such as the Raytheon Improved Hawk are delivered to fill Egyptian orders.

The Egyptian Air Defense Force operates more than 100 batteries of air defense missile systems and is composed of more than 80,000 men.

In order to provide adequate air defense coverage, Egypt must continue to operate Soviet-built hardware while expanding its force with European missiles and U. S. weapons.

Ministry of Defense officers said that during the next 10 years large numbers of Soviet missile systems will be phased out and replaced by western weapons systems, offering a large market for air defense equipment. The main obstacle to modernization of air defense forces is limited funding, but the government here is willing to spend outside of Foreign Military Sales credit to meet its established military requirements, officers here said, and European industry appears to be more aware of this than U. S. industry.

The price of doing business in Egypt for all military equipment, including air defense weapons, will be some form of participation in the production process to upgrade the technology base here, the officers said.

The Air Defense Force commander, Maj. Gen. el Sayed Hamdy, said that his service expects to take delivery this year of four General Electric TPS-59 three-dimensional radar systems and eight Westinghouse TPS-63 two-dimensional radars.

Egypt ordered the radar equipment for the Air Defense Force in November, 1979, at a cost of $87.4 million for the TPS-63s and $70.6 million for the TPS-59s plus eight operations centers.

Hamdy and officers at all levels of the Air Defense Force expressed impatience with the U. S. procurement and production system, partially because they need the equipment as soon as they can take delivery.

Egypt ordered in October, 1979, 11 Improved Hawk firing batteries and a training battery at a cost of $450 million. Approximately half that cost is for support and training over the next 18 months. There are 180 Egyptian Air Defense Force personnel already training on Improved Hawk equipment in the U. S., and a total of 320 will be trained there through 1983. The training is being conducted at various levels such as operating the firing equipment in batteries.

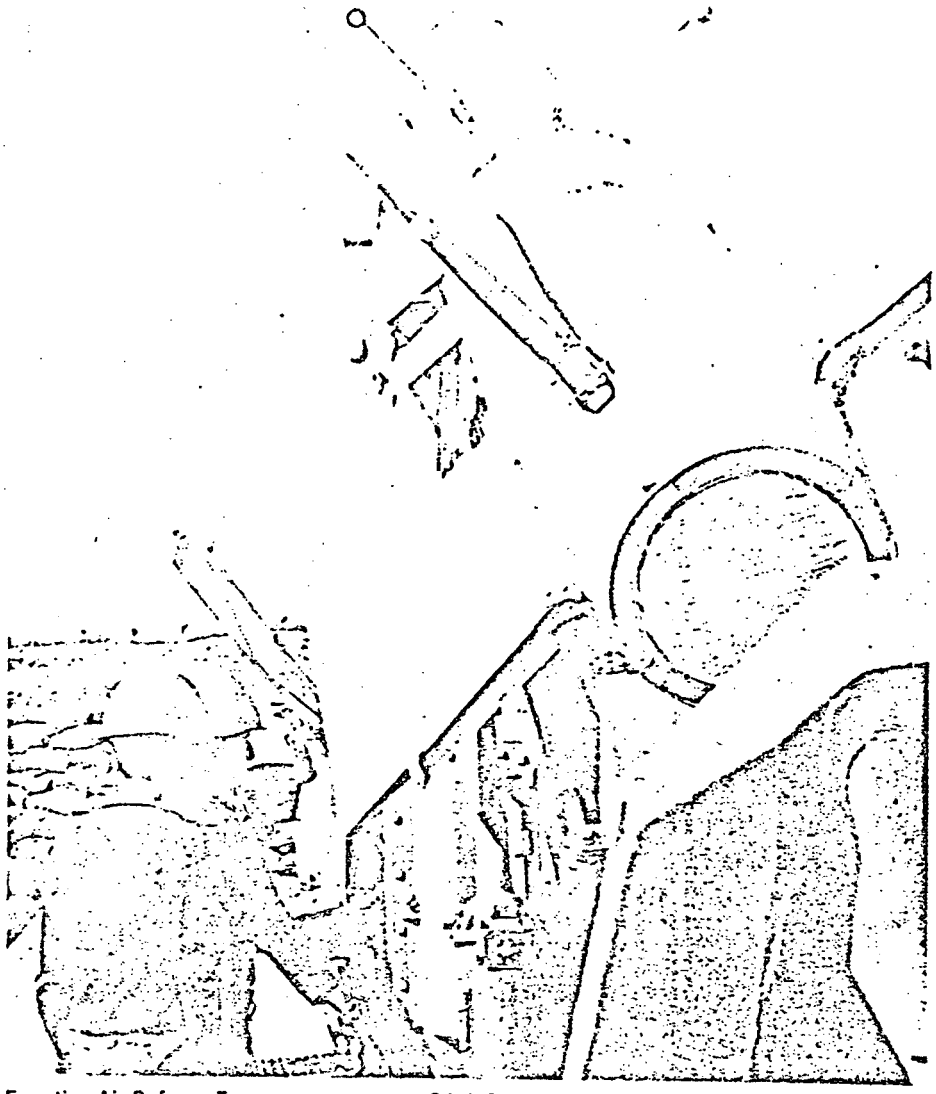
Instructors also are being trained in the U. S. to enable Egypt to establish its own training program at the Air Defense Institute in Alexandria in a five-month Improved Hawk training program.

The Egyptian Ministry of Defense and Hamdy have decided to build in nearby Naser City a central maintenance and storage facility for the Improved Hawk weapon system.

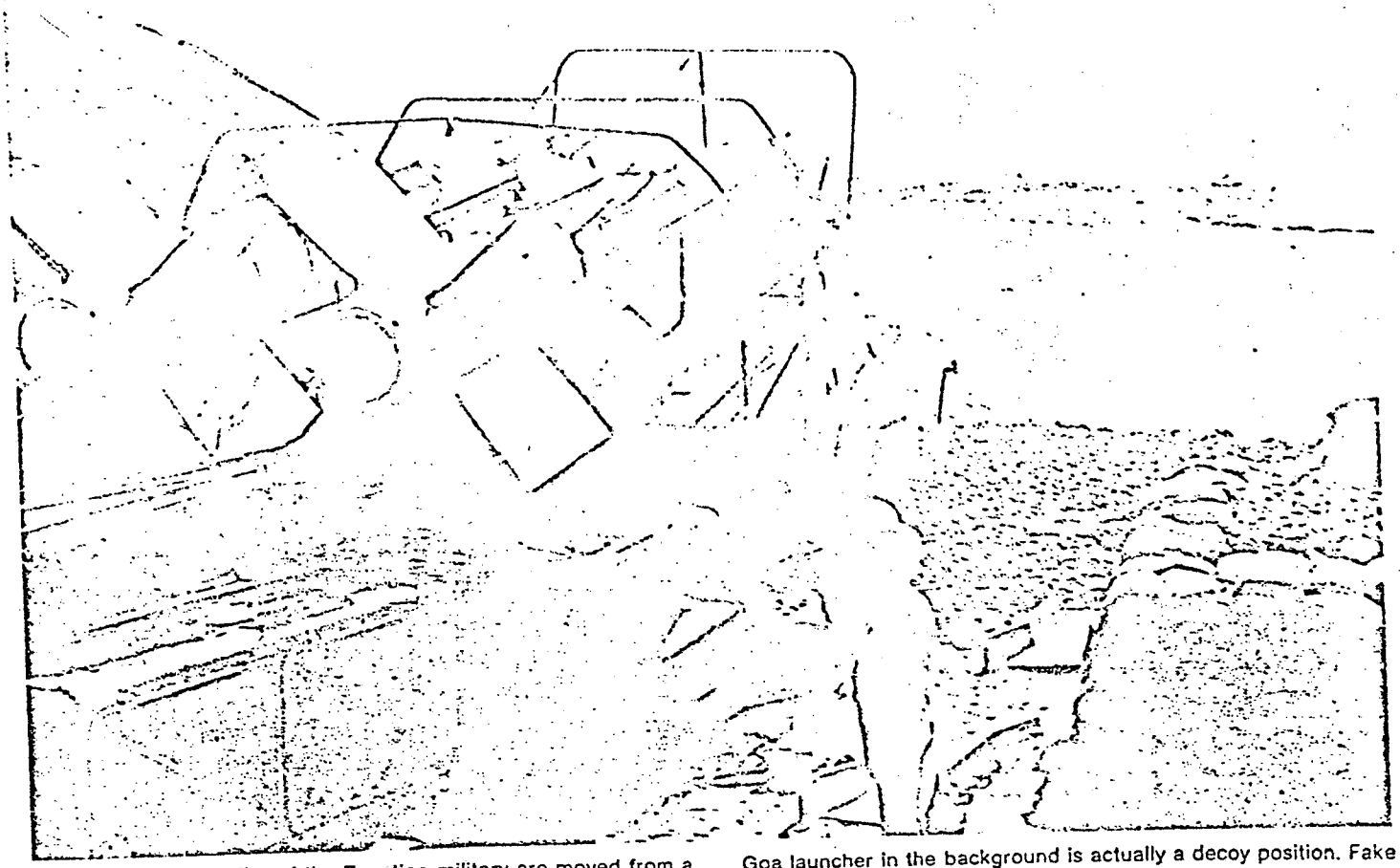
Egyptian Improved Hawk systems will begin arriving here this spring and systems integration with European and Soviet-built air defense missiles will be completed in early 1983, with a built-up operational capability taking place from that point on, according to officers here. Unit training with Egyptian Improved Hawk missile systems will begin here in late 1982.

Equipment for the first three Improved Hawk batteries for Egypt's Air Defense Force is now being integrated in El Paso, Tex., at the Raytheon facility adjacent to Ft. Bliss.

Raytheon has assigned six employees here and will build to a technical cadre of 30 persons by mid-1982 to support the Improved Hawk missile program in Egypt. The Army is preparing in Huntsville another Foreign Military Sales case for an additional four batteries of Improved Hawk missiles for Egypt, and it will be submitted to Congress for approval. Egypt



Egyptian Air Defense Force crew moves an SA-3 Goa surface-to-air missile into firing position on its twin-rail launcher to cover a sector defending two Egyptian air force bases northeast of Cairo against attack from the east. The first-stage propulsion section is on the aft end of the weapon. The first stage burns for approximately 3 sec. and is jettisoned as the second stage takes over to propel the missile to intercept. Cruciform control surfaces are affixed to the first stage as well as to the second stage aft end. There also are forward control fins on the second stage.



Goa air defense missiles of the Egyptian military are moved from a loading trailer onto the rail launcher for the Soviet-built surface-to-air missile. The missile launcher is equipment of an SA-3 battery northeast of Cairo in a desert position. What appears to be another Goa launcher in the background is actually a decoy position. Fake radar antenna, missiles and launchers are deployed with the SA-3 battery along with infrared and radiation emitters and smoke-generating equipment for protection.

expects to procure at least eight batteries, bringing the total to 24.

An Improved Hawk standard battery consists of:

■ Information coordination central van—This is the fire control data processing and communications center for the battery, which supplies automatic detection, provides priority of fire against targets, and supplies identification friend or foe. The van contains an automatic data processor, terminals and communications equipment.

■ Pulse acquisition radar—This is a high- and medium-altitude search radar providing detection at distances; it incorporates moving target indication, staggered pulse repetition rates, pulse video integration and electronic counter-counter-measures receivers. The radar operates in D-band, selected for all-weather performance.

■ Improved continuous wave acquisition radar—The radar is used for detection of aircraft flying at very low altitudes in the presence of heavy clutter. This radar and the pulse acquisition radar are synchronized in azimuth for target data correlation. The radar includes frequency modulation ranging and J-band frequencies. The FM is applied to alternate scans of the antenna to obtain target range information. During the continuous wave scan, range rate is obtained.

■ Range only radar—Each battery operates with this radar providing input to the battery fire control central when the high-power illuminator is unable to obtain range information because of countermeasures. The system can be operated automatically by the high-power illuminator, or manually by the fire control officer.

■ Battery control central—The control central element houses the displays for acquisition and fire control functions. The tactical control of the battery and the control of each firing section is performed in the control central van through the display equipment and controls.

■ High-power illuminators—There are two of the illuminators in each battery to acquire and track designated targets in azimuth, elevation and range rate. A target intercept computer is the interface unit, supplying azimuth and elevation launch angles computed by the automatic data processor to three missile launchers. The illuminator's J-band energy reflected off the target is received by the Improved Hawk missile guidance.

The Air Defense Force here is expressing an interest in having the Improved Hawk contractor integrate the TPS-63 and TPS-59 radar systems, and the Litton TSQ-73 missile minder control system with the Improved Hawk batteries. Egypt would furnish its own IFF system produced here at the Benha electronics factory.

Combined command posts are operated all over the country in sectors and subsectors for air defense. Some of the equipment is automated, but it is aging Soviet gear that needs replacing. Most of the air defense functions are carried out manually in the command posts, which are manned by the Air Defense Force brigade commander and his counterpart Egyptian air force wing commander.

In the command posts, the Air Defense Battle Staff controlling surface-to-air missiles is combined with the fighter intercept staff-controllers for ground-controlled intercepts. Information is compiled in the command post, processed for display and simultaneously transmitted to subordinate command posts.

The command posts are located deep underground in reinforced concrete bunkers with heavy blast doors, even in isolated desert areas. In addition to Soviet-built early warning and detection radars, Egypt relies heavily on the human factor

for aerial target surveillance, especially against low-altitude aircraft.

The heavily fortified air defense command posts were constructed throughout Egypt during the war of attrition with Israel, and Egyptian officers refer to the construction as the engineer war, because of the heavy casualties experienced in the construction of the sites.

Operations Center

The main operations center for Egypt's Air Defense Force is located deep inside a mountain near the Air Defense Force headquarters on the western outskirts of this city. Officers here claim that it could even withstand a nuclear weapons attack and continue to function, even if at a degraded capability.

The nation continues to depend heavily on Soviet-built SA-2s, SA-3s, SA-6s, SA-7s and ZSU-23-4 air defense weapons, according to Hamdy. He said the Air Defense Force is beginning to experience some problems with missile shelf life but is managing to maintain the weapons operationally.

"Even with the use of the Thomson-CSF Crotale already added to our forces and with the inclusion of the Improved Hawk missiles, we still do not have sufficient air defense missiles in relation to the threats Egypt faces," Hamdy said. He added that, despite outdated technology in the Soviet weapon systems in Egypt, they work effectively and are sorely needed until they can be replaced.

Hamdy said, as an example, that the Air Defense Force faces over 400 modern Soviet-built fighters positioned in Libya alone, with large numbers of Soviet air defense missiles positioned to defend the fighters.

He said the Air Defense Force needs 40 firing units of the U. S. Army/Ford Aerospace Chaparral surface-to-air missile system, but that he has been told the system would cost approximately $4 million each. For that reason, Egypt has increased its interest in additional Crotales, or perhaps procurement of the Shahine variation Thomson-CSF weapon produced for Saudi Arabia.

"We would need a good financial arrangement in order to buy more Crotales," Hamdy said. "Each missile costs approximately $250,000."

He said his highest priority is to get the first 11 batteries of the Improved Hawk in service and that President Mohamed Hosni Mubarak was promised by President Ronald Reagan that deliveries of U. S. military equipment to Egypt would be expedited, if at all possible. "We will need 12 additional Improved Hawk batteries after 1985, because the Soviet missiles will no longer be operational at that time," the general said.

Egypt expects to continue receiving spares for its Soviet-built missile systems from Europe and the U. S. The first U. S.-produced spares for the SA-3 are expected to be delivered here in approximately six months. Some SA-6 and SA-7 spares and components already have been delivered by U. S. companies, and France's Thomson-CSF also has provided spare parts for Soviet missiles in Egypt. Improvements have been made to the spares with the addition of electro-optical systems for use in electronic warfare jamming. In the U. S., according to officers here Teledyne is prime contractor to the Army Missile Command, with a large number of other contractors providing non-standard limited production run items through the U. S. Army to Egypt.

The SA-7 infrared-guided missile system used here for low-altitude air defense has been modified wiith the addition of an identification friend o foe system, officers said. They added that the SA-7 has been further modified by Egyptian industry to transmit false engagement signals before the weapon is fired to force the target to take evasive action. Once that action begins, the missile is fired. The SA-7 also has a night vision device added to utilize ambient light to illuminate the target, officers said. They plan to deploy the SA-7 on jeep-mounted launchers.

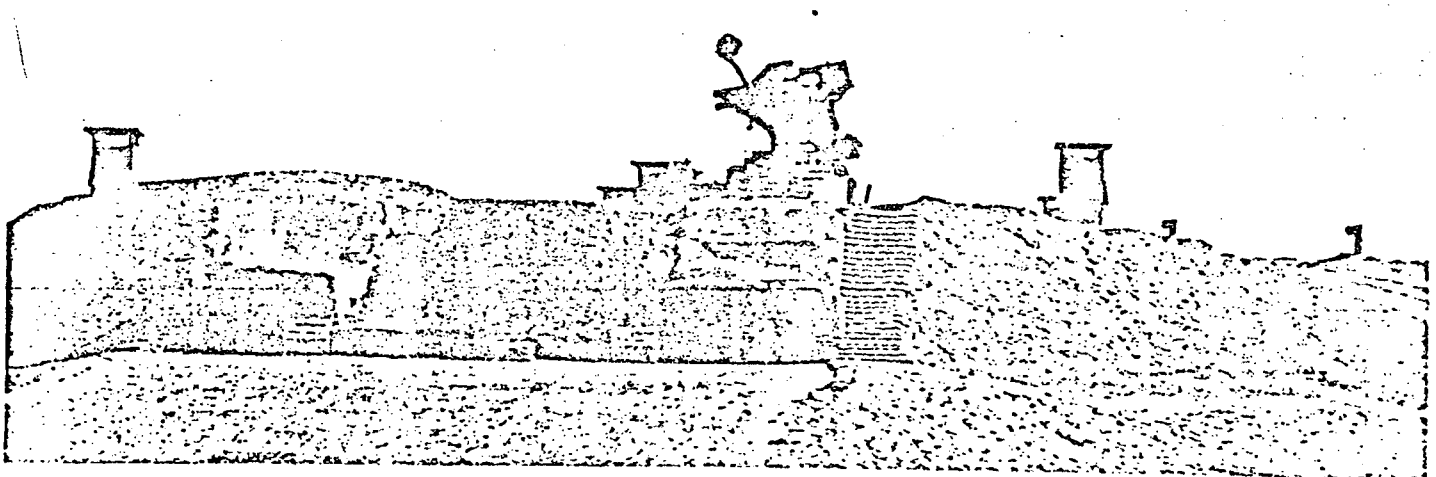
Hughes Aircraft is in the final phase of completing a $1-million study contract for the Air Defense Force on an integrated and automated air defense system. Under the concept, officers here said, sector command posts would be combined and linked together with command centers in a multichannel microwave system tying in automated displays and controls.

Similar System

The Hughes integrated system would be tailored along the lines of work accomplished by the company in South Korea and Singapore, with the use of additional Hughes radar systems such as the air defense radar designed to handle simultaneous attacks from several directions.

The long-range Hughes air defense radar is a three-dimensional S-band phased-array system designed to detect targets in heavy clutter and intense electronic countermeasures.

Another Hughes radar that could be included is the variable search and track air defense system. Mounted on a tracked vehicle, the phase-phase electronic-beam-scanning radar antenna is rotated 360 deg. to provide coverage in azimuth. This radar system has a track file size of 400 targets and a range of 250 km. (156 mi.) and uses a search track sequence for coverage. Search ranges and waveforms are maximized for long- and mid-range coverage. Track is established on the same scan as detection, and higher update rates are used for close-in targets. □



Low Blow missile control radar antenna is emplaced on top of dirt-covered bunkers of reinforced concrete approximately 20 ft. underground. The bunkers house the guidance and control van for the SA-3 missile battery along with two 100-kw. power supply generators. Roadways of concrete lead into the shelter at steep angles so the SA-3 battery can be moved and redeployed. The Low Blow radar system interfaces with the SA-2 missile radar in I-band. The missile is captured in the radar beam and guidance orders are transmitted to the missile. A signal also is transmitted to activate the Doppler radar fuze for the fragmentation warhead.